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Network Enabled Digital Swarm Image Synthesis (NEDSIS) Phase 2

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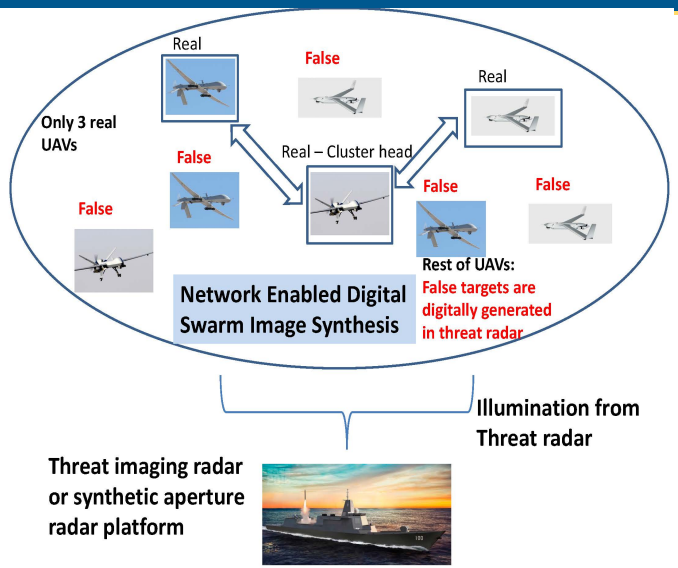

Concept of generating false "swarm" against enemy radar

Work and Solution Proposed

- **Proof of concept:** To implement NEDSIS, a proof-of-concept is needed. The ECE Sensor Group has the necessary equipment to show proof-of-concept.
- **FPGA based:** Most NEDSIS signal processing algorithms are implemented in field programmable gate array (FPGA) device, which is a very powerful, low weight, and low-cost solution.
- **Cost, Size, Weight and Power (CSWaP):** A FPGA may be reprogrammed at a later time for added capability. In addition baseband communication and networking needed to support NEDSIS may also be programmed into the FPGA thereby creating a multifunction chip for CSWaP.
- **Supporting Software and Hardware:** Existing work and codes (used to generate digital images) may apply to creating false swarms. The PIs have existing works/codes. PIs have access to inexpensive radars that can emulate "threat radars". PIs already have two Altera Stratix-V FPGA design boards.

Background

- With adaptive electronic maneuver warfare (EMW) techniques, it has become difficult to perform conventional electronic attack (EA) such as frequency jamming on threat imaging radars.
- Due to payload and other practical requirements, the mission may be effectively served with a smaller group or swarm but made up of larger UAVs (instead of larger swarm but micro-UAVs)
- Threat platform may image the UAV network via radar.
- It is proposed to create false UAV swarm via a novel technique called network-enabled digital swarm image synthesis (NEDSIS) to counter the threat platforms.

Value to the Fleet

- Electromagnetic (EM) spectrum is a resource. Moreover it is a terrain.
- Maneuver and deception techniques are key in this terrain.
- Network Enable Digital Swarm Image Synthesis is a deception technique that can be used a small network of UAVs.
- NEDSIS create a "false but much larger" swarm as imaged by threat radars.
- Obfuscates the scenario for the enemy.
- Protects the UAV network and help achieve mission.

CRUSER Consortium for Robotics and Unmanned Systems Education and Research

FY18 Call for Proposals

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